

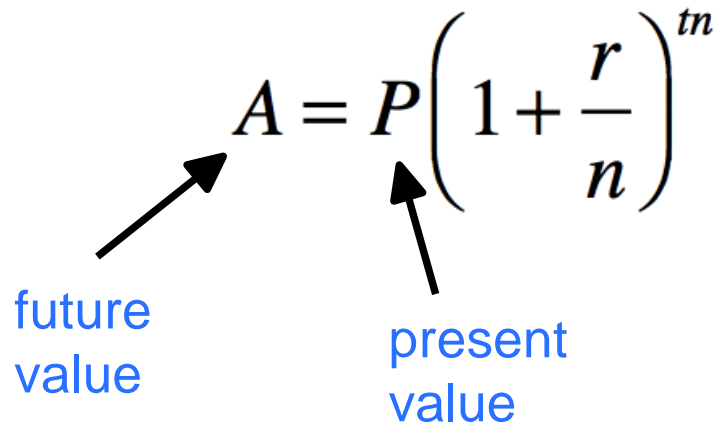
Unit 16

Day 2

Compound Interest

COMPOUND INTEREST is interest paid on both the principal and the interest of an investment.

If  $P$  dollars is deposited in an account paying an annual rate of interest  $r$  compounded  $n$  times per year, then after  $t$  years the account will contain  $A$  dollars, where

$$A = P \left( 1 + \frac{r}{n} \right)^{tn}$$


The diagram illustrates the components of the compound interest formula. An arrow points from the text "future value" to the variable  $A$  in the equation. Another arrow points from the text "present value" to the variable  $P$  in the equation.

Using the abbreviation FV for future value and PV for present value, the formula for compound interest becomes,

$$FV = PV \left( 1 + \frac{r}{n} \right)^{tn}$$

Find the future value of \$1000 invested at 9% compounded annually for 10 years.

$$FV = PV \left(1 + \frac{r}{n}\right)^{t \cdot n}$$

$$FV = 1000(1 + .09)^{10}$$

$$FV = \$2,367.36$$

Find the future value of \$12,000 invested at 6% compounded quarterly for 5 years.

$$\begin{aligned} FV &= 12000 \left( 1 + \frac{.06}{4} \right)^{5 \cdot 4} \\ &= \$16,162.26 \end{aligned}$$

Find the future value of \$12,000 invested at 6% compounded monthly for 5 years.

$$\begin{aligned} FV &= 12,000 \left( 1 + \frac{.06}{12} \right)^{60} \\ &= \$16,186.20 \end{aligned}$$

Find the present value of \$12,250, assuming a 6% interest rate compounded annually for 10 years. In other words, what would one have to invest NOW to earn \$12,250 at the end of 10 years?

$$12,250 = PV(1 + .06)^{10}$$

$$PV = \frac{12,250}{(1.06)^{10}}$$

$$PV = \$6,840.34$$

What is the future value of an investment of \$2,000 invested at 4%, compounded monthly, for 11 months?

$$FV = 2000 \left( 1 + \frac{.04}{12} \right)^{\frac{11}{12} \cdot 12}$$

~~$$FV = 20$$~~

$$FV = 2074.57$$



What interest rate would be required to allow an initial investment of \$3,500.00 to yield \$4,500.00 at the end of 5 years compounded quarterly?

**BOARD STOPPED WORKING!**

What interest rate would be required to allow an initial investment of \$100,000 to yield to \$181,871.97 at the end of 8 years compounded monthly?

Homework

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